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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/748,188
Filing Date: December 27, 2000
Appellant(s): IIJIMA, TADAYOSHI

Robert S. Green
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed August 23, 2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct. The examiner notes that there is a typo in the last line of this section. "February 6, 200**6**" should be February 6, 2004.

(5) Summary of Invention

The summary of invention contained in the brief is deficient because it fails to disclose the pressurizing step required by all of the claims on appeal. All of the claims on appeal require the layer containing the conductive fine particles to be compressed at a compression force of at least $44N/mm^2$. Aside from this omission the examiner otherwise agrees with the appellants summary of the invention.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The appellant's statement in the brief that certain claims do not stand or fall together is not agreed with because applicant's in the argument section of their brief merely point out that claims 2 and 3 do not have the same scope as claim 8. Specifically, applicant's state:

> "Claims 2-3, being dependent upon claim 8, are also allowable for the above. Moreover, these claims are further distinguished by the materials recited therein, particularly within the claimed combination."

Appeal Brief, Page 9, Paragraph 5. Per MPEP § 1206, "Merely pointing out the difference in what the claims cover is not an argument as to why the claims are separately patentable." Thus, the examiner disagrees with the statement by the appellant that claims 2, 3 and 8 do not stand or fall together.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

US5411792	Yukinobu et al.	05-1995
BE1011577*	Strebelle et al.	11-1999

Strebelle et al. "Epoxidation Catalyst, Its Use And Epoxidation Process In The Presence Of This Catalyst," US2002/0091277A1 (utilized as an English translation of BE1011577*)

*The examiner in the final rejection dated 10/06/03 and the non-final rejection dated 03/03/04 cited BE1011577 by its application number, BE09700962.

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 8 and 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yukinobu et al. (US5411792).

Claim 8 requires a transparent conductive film comprising a compressed layer on a support, wherein the compressed layer contains conductive particles and a resin, wherein the amount of resin is 0.03-9.3 parts by volume with respect to 100 parts by volume of the conductive particles, wherein the compressed layer is formed by compressing the conductive particles and the resin on the support with a compression force of $44N/mm^2$, and the compressed layer further comprises an impregnated transparent substance.

The examiner interprets the limitation, "the amount of resin is 0.03-9.3% by volume with respect to 100 parts by volume of said conductive particles" to refer to the amount of resin alone, and not the sum total of the resin and impregnated transparent substance.

Yukinobu et al. (hereafter Yukinobu) teaches a method for making a transparent conductive film, wherein a coating solution containing ultrafine particles of a conductive oxide (equivalent to applicants claimed conductive particles) is formed onto a support (equivalent to applicants claims support), after which the layer is dried and rolled with a

steel roller to form a transparent conductive film (columns 2 and 3, lines 65-5). Specifically, Yukinobu teaches in examples 15-17 a method wherein a coating solution that contains ITO particles (known to be conductive) and an acrylic resin is applied to a polyimide support. After this solution is applied to the support, the film is then heat treated at 400^0C, during which the acrylic resin is carbonized. Then the film is rolled under a linear pressure of 100, 200, or 300kgf/cm respectively to form a conductive film. The film is then over coated with a transparent substance (equivalent to applicants claimed impregnated transparent substance) (see columns 13-14).

Yukinobu does not teach that 0.03-9.3 parts by volume of the resin resin with respect to 100 parts by volume of the conductive particles is present in the film. Further, Yukinobu does not teach the required compression force of $44/N/mm^2$.

Regarding the required parts by volume of resin, the examiner specifically notes that the amount of resin required by the instant claims is dependent on the amount of particles utilized. Thus, if a small amount of particles is utilized by the prior art, only a small amount of resin will be required to meet the instant claims. Thus, it is clear that Yukinobu, which utilizes very small amounts of ITO particles (see tables at column 7-8, entries denoted as coating liquid one through coating liquid six) need only contain a residual amount of polymer to read on applicant's claimed part by volume limitation.

It is the examiners position that a after the heat treatment step utilized by Yukinobu, a small residual amount of resin will remain in the conductive film. With this in mind, Yukinobu teaches in the background that it is known that the amount of the resin present in a transparent conductive film is too high, the film will not exhibit good

resistivity, whereas if the resin content is too low, the film is excessively porous and becomes hazy (column 1, lines 29-60). Thus, the amount of resin remaining in the film is a results effective variable.

In light of the teaching in Yukinobu that the amount of resin in a transparent conductive film impacts the haze and resistance properties of the transparent conductive film, it would have been obvious to one of ordinary skill in the art at the time the invention was made to control the amount of resin remaining in the film of Yukinobu in order to obtain a transparent conductive film that exhibited desired resistance and haze properties.

Regarding the required pressure treatment step and specific compression force. Yukinobu et al. teaches many specific embodiments (see examples 15-20) wherein an ITO containing ink is applied to the surface of a polyimide film to form a coating, heat treated, overcoated with an additional ITO containing dispersion, dried, and subsequently rolled with a steel roller at a linear pressure of 100kgf/cm, 200kgf/cm, and 300kgf/cm. Unfortunately, without the compression length, the pressure utilized by Yukinobu (kgf/cm) cannot be converted to the applicants claimed units (N/mm^2). However, Referring to table 5 of Yukinobu, it is evident that as the roller pressure increases, the surface resistance and light transmission of the film of the film decreases (conductivity increases with increased roller pressure). Thus, the examiner takes the position that the pressure exerted on the functional film is a results effective variable.

Therefore it would have been obvious to one of ordinary skill in the art to adjust the amount of pressure applied to the film of Yukinobu in order to obtain a film that exhibits a desired level of surface resistivity and light transmittance.

The limitation, "formed by applying a dispersion liquid which contains conductive fine particles and a resin onto a support and drying the liquid" in claim 2 is a process limitation in a product claim and does not appear to be further limitation insofar as far as the structure of the product is concerned. Even though product claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP § 2113. Here, the limitations of claim 2 are directed towards an intermediate solution that is utilized to form the applicant's end product, namely the film required by claim 8. Equivalent precursor films containing conductive particles and 0.03-9.3 parts by volume of a resin can be manufactured in different ways and from different precursor solutions than that specifically required by the applicant in claim 2. It has not been established on the record that the solution claimed by claim 2 imparts some structural, chemical, or physical property difference to the end product. Accordingly, the examiner takes the position that the limitations of claim 2 are met as set forth above for claim 8.

Regarding the limitations of claim 3, wherein the applicant requires the support to be a resin. Yukinobu in examples 15-18 as stated above

utilizes a polyimide film as a support. As polyimide is a resin this limitation is met.

(11) Response to Argument

Appellant first notes, "that the examiner continues to parse the claims, stating that the limitation "formed by compressing the conductive fine particles and the resin on the support" is a process limitation, and does not further limit the structure of the product." Appeal Brief, Page 6, paragraph 1. Appellants note is simply incorrect. The examiner in the last office action (dated 03/03/2004) never once asserted that the compression step required by claim 8 was a process limitation that didn't impact the structure of the final product. The examiner wholeheartedly agrees that this compression step does impact the structure of the final product, as it will result in increased contact between conductive particles in the conductive film, thereby lowering resistivity. Further, the examiner expressly considered the compression force limitation in the last office action (Office action Dated 03/03/2004, page 4 paragraph 10). Thus, this argument is moot.

Next, the appellant argues that the examiner failed twice to respond to the appellant's challenge of the official notice taken by the examiner in the office action dated 03/14/2003, and therefore the conclusion reached by the examiner is de facto nullified. Therefore the appellant asserts that a

prima facie case of obviousness has not been presented, and the rejection cannot be sustained.

The examiner disagrees. The examiners assertion that a small amount of resin will remain after the calcination step of Yukinobu is clearly supported by Belgian Patent # BE1011577 (the Belgian reference). This reference was cited by the examiner in the office action dated 10/06/2003 (see page 3 section 5) in response to appellant's first challenge. While the examiner cited the Belgian reference in the response to arguments section of that office action and did not incorporate it into the statement of rejection (i.e. the examiner did not state "Claim 8 is rejected under 35 U.S.C. 103(a) as unpatentable over Yukinobu et al. as evidenced by BE1011577), the reference is nonetheless of record and supports the examiners assertion that residual resin will remain in polymer films after a calcination process (See US2002/0091277 (an English equivalent of BE1011577), section 31). In response to the second challenge, the examiner simply maintained his position.

Appellant's argument that the examiners conclusion is de facto nullified hinges on the assumption that because the Belgian reference was not incorporated in to the statement of rejection, the examiners assertion is uncorroborated and therefore null and void. First, the examiner maintains that the Belgian reference was made of record, and therefore the appellant's argument is moot. Second, the examiner maintains that

even if, for the sake of argument, the Belgian reference is not technically of record, the examiners assertion is still valid. Patent applications are examined by reviewing the information that would be known by one of ordinary skill in the art at the time the invention was made, not by what is made "of record" in a document by the Patent Office. Even if the Belgian reference is not technically "of record," one of ordinary skill in the art at the time the invention was made would have known that residual resin will remain after a resin film is subject to calcination. The Belgian reference is merely cited to provide evidence for that assertion, and is not required to maintain the rejection.

Next, the appellant argues against the examiners assertion that the amount of resin in the film is a result effective variable. Specifically, the appellant argues that while there is a presumption that optimization of ranges or variables would be obvious to one of ordinary skill in the art, an exception to this rule occurs in cases where the variable to be optimized was not recognized to be a results effective variable. The appellant relies on *In Re Antonie*, 559 F.2d 618 (CCPA 1977) to support this argument. While the examiner agrees that *Antonie* does teach an exception to the obvious to optimize rationale when a variable is not recognized to be a results effective variable, the exception does not apply in this case. The *Antonie* courts decision was predicated on the court finding the reference cited by the examiner in that case to be devoid of any teaching or

suggestion to optimize a variable in the manner suggested. In the instant case however, Yukinobu explicitly recognizes in the background that the amount of resin in a transparent conductive film impacts the conductivity and transparency of the film (See Yukinobu, column 1, lines 35-55). In fact, Yukinobu states, "therefore the resin as the binder should be used in an optimum amount" (column 1, lines 51-53). This is a clear teaching and suggestion to optimize the amount of resin in the transparent conductive film as suggested by the examiner.

The appellant then argues that even if it is assumed that the examiners conclusion that it would have been obvious to control the amount of resin in the film of Yukinobu in order to obtain a transparent conductive film of a desired resistance and haze is valid, the reference still does not disclose, teach, or suggest either the amount of resin, or the relationship of the amount of resin relative to the amount of conductive particles. Thus, appellant asserts that the examiner's results effective variable argument is incomplete and cannot be sustained.

The examiner disagrees. It is acknowledged that Yukinobu doesn't teach the amount of resin remaining in the film after calcination. Further, the examiner admits that the ratio of resin to binder after calcination is not capable of being calculated based on the information provided by Yukinobu. However, the instant claims only require that the Yukinobu film contain *residual* resin binder (as further explained below). The examiner

maintains that residual resin will remain in the film after calcination, and that it would have been obvious to one of ordinary skill in the art to control this residual amount so as to obtain a film having desired conductivity and haze. The suggestion to control the amount of resin in a transparent conductive film is explicitly suggested by Yukinobu as detailed above.

A major point that needs to be stressed is that the amount of resin required by the instant claims is completely dependent on the amount of conductive particles utilized. If a prior art reference teaches a transparent conductive film containing *large* amount of conductive particles, the film will have to contain *non-residual* amounts of resin in order to read on the applicant's claims. Conversely, when a reference teaches a transparent conductive film utilizing a *small* amount of particles (as in Yukinobu), only *residual* amounts of binder will need to be included in the prior art transparent conductive film in order for the prior art reference to read on the claims.

To illustrate this point, Yukinobu in one example utilizes a coating composition containing 5 parts by weight Indium Tin Oxide (ITO) particles, 5 parts by weight resin, and 90 parts by weight solvent (see column 8, Table 1, coating liquid 4). This corresponds to a coating solution containing 5g ITO, 5g resin, and 90g solvent. When the coating liquid is deposited on the support and calcined, the solvent will evaporate, and some of the resin will be carbonized. As evidenced by the Belgian reference, some

of the resin will remain as residue. As a result, the transparent conductive film of Yukinobu will contain 5g of ITO particles and residual resin.

With the above in mind, the instant claims merely require 0.03 parts by volume (pbv) of resin relative to 100 pbv particles. This corresponds to a requirement of $0.03cm^3$ resin for every $100cm^3$ particles, or $0.0003cm^3$ resin per 1 cm^3 particles. Noting that ITO is known to have a density of ~$7g/cm^3$ and resins typically have a density of ~$1g/cm^3$, the examiner performed the following calculation using the amount of particles that would be present in a film formed by applying Yukinobu's coating liquid #4:

1) (5g ITO * $1cm^3$ ITO/7g ITO) = .71 cm^3 ITO

2) ($0.0003cm^3$ resin/cm^3 ITO) *0.71 cm^3 ITO= 0.000213 g resin

The number derived by calculation number 1 corresponds to the volume of ITO in a film formed by applying Yukinobu's coating liquid 4 to a support and calcining it. The number derived by calculation number 2 is the amount of resin in grams that must be present in the film after calcination in order to constitute 0.03 parts by volume resin based on 100 parts by volume particles (in other words, it is the amount of resin required to be in the film formed by Yukinobu's coating liquid number 4 after calcination). As is clearly shown by calculation number 2, in the case of a film formed by coating liquid number 4 of Yukinobu, *two ten thousandths of a gram* of resin is all that needs to be present in the film after calcination in order to meet the part by volume resin requirement of the instant claims. Clearly, this is a residual amount of resin.

While the examiner does not assert that Yukinobu *necessarily* contains this amount of resin, it is a certainty that the film will contain some residual resin (as evidenced by the Belgian reference). While the amount of residual resin is not detailed

by Yukinobu, Yukinobu recognizes that the amount of resin in a transparent conductive film impacts the conductivity and haze of the film, and that a "optimum" amount of resin should be utilized. In view of this knowledge, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time the invention was made to control the amount of resin residue left over after the calcination step of Yukinobu to as to obtain a desired level of haze and conductivity. Further, if the appellants range is truly the "optimal range," then the suggestion of Yukinobu would lead one of ordinary skill to control the amount of resin to the claimed range (as, once again, Yukinobu specifically states that an "optimum" amount of resin should be utilized). This is particularly true given the fact that there are only two components in the calcined film of Yukinobu, namely resin and ITO particles. Thus, controlling the resin component to an "optimum" value as suggested by the reference would necessarily control the ratio of resin/particles to the appellant's claimed range.

Next, the appellant argues that the factual inquiries required by *Graham v. John Deere* (*Deere*) were not properly considered or properly determined. The examiner is at a loss as to how to respond to this assertion, as the appellant does not point out what elements of the *Deere* test were not considered or were determined improperly. The appellant merely makes a blanket assertion that the required inquiries whether were not made or were determined improperly. The examiner disagrees with this assertion. As evidenced by the prior office actions, the examiner clearly determined the scope and content of the prior art, and explained the differences between the prior art and that of the instantly claimed invention. Further, the examiner determined that it would have

been obvious to one of ordinary skill in the art at the time the invention was made to modify the prior art so as to arrive at the claimed invention. Thus, it is evident that the examiner considered the factual inquiries of Deere. With respect to appellants follow up argument relating to the actual amount of resin, the carbonization of the resin, and the relative amount of resin to particles in Yukinobu, this argument is addressed above (relating to the residual resin).

The appellant then argues that even if some residue is left over after the calcination step of Yukinobu, the resin does not function as a binder. This argument is utterly moot. The instant claims require "a resin." The function of the resin as a binder is **not** required. Further, the appellant has not acted as his own lexicographer and defined "a resin" as meaning a resin that functions as a binder in either the specification or the claims. Thus, the appellant is arguing claim limitations that are not present in the claims. While the specification may note the function of the resin as a binder, the resin is not defined in this manner. It has long been recognized that while claims are read in light of the specification, limitations from the specification are not read into the claims.

Finally, appellants argue that the instant invention is designed so as to avoid the use of a calcining step. Specifically, appellants note a portion of their specification that recites the unfavorable influence of a calcination process on transparent conductive films. In particular, appellants note that the calcination process makes it difficult to form a transparent conductive film on the surface of a resin film, because the high temperature required by the calcining step will melt/carbonize/burn the resin film.

While the examiner acknowledges that the calcination process *may* have detrimental effects, the evidence provided by Yukinobu is contradictory to the appellant's assertion. Yukinobu does not disclose that there are any problems with forming transparent conductive films on supports of polyethylene terephthalate or polyimide (both well known resins) when a process including a calcining step is used (see Yukinobu examples). In addition, appellant's claims do not require manufacturing the claimed product by a process that occurs below a set temperature. Even if such a process were required however, there is no evidence on the record that such a process would result in a materially or structurally different transparent conductive film then that of a film produced by the Yukinobu method.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Nikolas J. Uhlir

October 25, 2004

Conferees

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